

Zeta Alarm Systems

72-78 Morfa Road, Swansea, SA1 2EN, UK

Phone +44 (0) 1792 455175, Fax +44 (0) 1792 455176, E-mail: sales@gltextports.com

technical@gltextports.com

Visit us at <http://www.zetaalarmsystems.com>



Propane Gas Sense Instructional Manual

1. CONTENTS	
1. CONTENTS.....	2
2. INTRODUCTION.....	4
2.1. ABOUT ZETA FIXED GAS SESNOR, THE GAS SENSE	4
2.2. PRINCIPLE OF OPERATION	4
2.3. DETECTOR OVERVIEW AND INDICATIONS	5
2.3.1. DECSRIPTION OF NAVIGATION BUTTONS	5
2.3.2. DISPLAY BAR	5
2.3.3. ALARM LEVELS	6
2.4. INSTRUMENT CONSTRUCTION.....	7
3. INSTALLATION.....	8
3.1. CONDUCTING SITE SURVEY	8
3.2. PROPANE GAS SENSE SITTING AND SPACING.....	8
3.3. FIXING THE DETECTOR TO THE WALL	9
3.4. WIRING THE GAS SENSE	10
3.4.1. IN STAND-ALONE MODE, STD	10
3.4.2. IN SYSTEM MODE, SYS.....	11
3.5. CONNECTING SOUNDER TO STAND-ALONE GAS SENSE	11
4. OPERATING THE GAS SENSE	13
4.1. GAS SENSE ADDRESSING.....	13
4.2. USER CONTROLS	13
4.3. VIEWING THE ALARM LEVELS	13
4.3.1. VIEWING THE ALARM LEVEL AS A STAND-ALONE DEVICE	13
4.3.2. VIEWING THE ALARM LEVEL AS A LOOP DEVICE	14
4.4. SETTING-UP OR ADJUSTING THE PRE-ALARM LEVEL.....	14
4.5. SETTING-UP OR ADJUSTING ALARM 1 LEVEL.....	15
4.6. SETTING-UP OR ADJUSTING ALARM 2 LEVEL.....	15

5.	FAULT-FINDING AND MAINTENANCE PRACTICES	17
5.1.	VERIFYING INSTRUMENT PERFORMANCE-BUMP TESTING.....	17
5.2.	DETECTOR SERVICING AND SENSOR REPLACEMENT	17
5.3.	GENERAL FAULT-FINDING.....	18
5.3.1.	STD AND SYS FAULT	18
6.	PCB TERMINATIONS AND TECHNICAL SPECIFICATIONS	19
6.1.	TECHNICAL DATA	19
6.2.	NORMAL DEVICE OPERATIONS.....	20
6.3.	MOLECULAR WEIGHT OF TARGET GASES	20

2. INTRODUCTION

This document is intended to serve as an Instructional manual for fixed gas detection instrument offered by Zeta Alarm Systems a brand name of GLT Exports Limited, namely the Gas Sense.

2.1. ABOUT ZETA FIXED GAS SESNOR, THE GAS SENSE

- It is designed to monitor propane gas leaks.
- It has an external alarm output plus 3 “volt free” alarm relays
- With its rugged casing, it is designed to withstand rough handling.
- A 24V direct reading gas monitoring system with programmable 3 alarm levels
- It operates as standalone device and can also run with Zeta central gas control panel, ZSC100 as a loop device

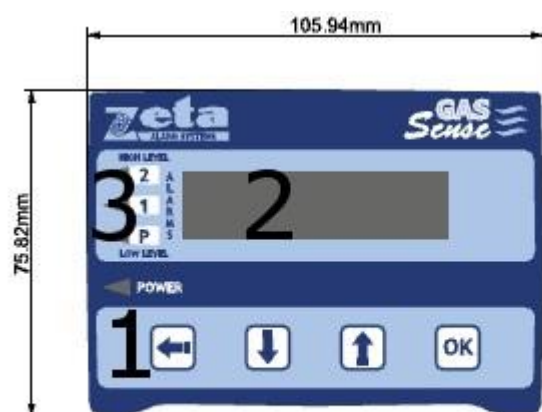
2.2. PRINCIPLE OF OPERATION

A loop of Zeta Gas Sense (currently up to 48) can be set-up to transmit gas levels to central control panel, ZSC100. This makes simultaneous monitoring of various gases of interests easy.

The units operate by continuously transmitting their sensor readings to the control panel, which in turn monitors for changes to the programmed thresholds. If the sensor reading exceeds the threshold, the panel and detector display the gas concentration level in percentage of the lower explosive limit (%LEL). Appropriate alarm level is triggered while the sounders and relays are operated.

Gas Sense similarly operates as a stand-alone detection instrument. In this mode of operation, the detector displays read gas level within the monitored area on its screen and triggers appropriate alarm level.

2.3. DETECTOR OVERVIEW AND INDICATIONS



1	Navigation buttons bar
2	Display bar
3	Alarm level indicators

2.3.1. DESCRIPTION OF NAVIGATION BUTTONS

Button	Description	Use
←	Escape	Used to leave current menu
↓	Adjustment	Scroll/adjust settings downwards
↑	Adjustment	Scroll/adjust upwards
OK	Enter	Used to confirm actions/settings

2.3.2. DISPLAY BAR

The status of the monitored area or the detector is displayed on the 2x16-character length screen. Propane concentration is displayed as percentage of its lower explosive limit.

STD GAS NAME

SYS GAS NAME

NORMAL Conc. in %LEL

NORMAL Conc. in %LEL

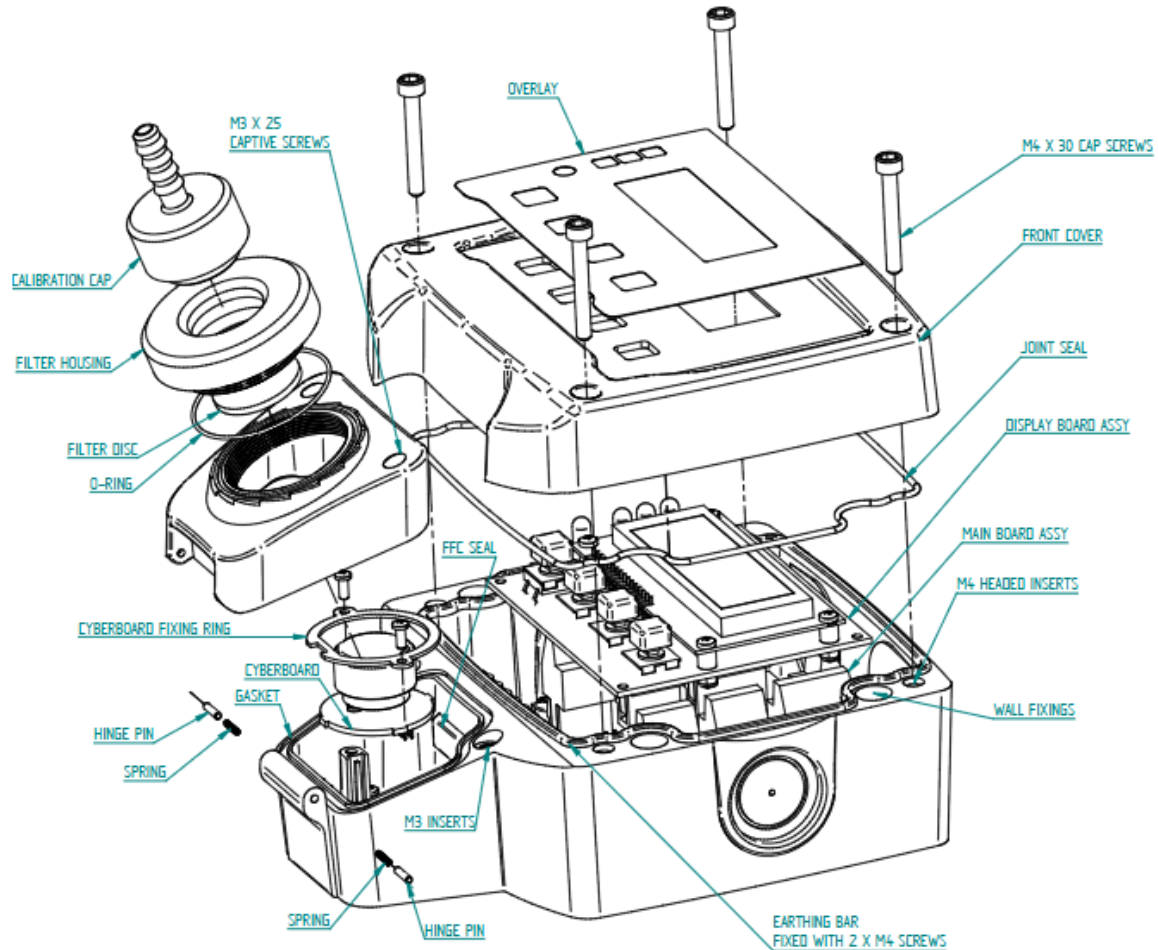
2.3.3. ALARM LEVELS

There are 3 alarm levels.

Alarm level	Description	Meaning
P	Pre-alarm	The lowest gas concentration warning
1	Alarm 1	Warns of rising gas level. An indication of impending danger
2	Alarm 2	Area is toxic and/or, explosive.

When the 3 alarm LEDs are red, it means the atmosphere is very flammable or toxic with respect to concentration of the target gas!

2.4. INSTRUMENT CONSTRUCTION



The Detector design consists of 2 chambers. The main chamber houses all the electronics, and is where all electrical connections are made. The second chamber is where the sensor element is located.

This design allows the sensor element to be easily replaced by removing 2 external screws, and 2 internal screws.

This avoids all contact with the main electronics. The housing is made from flame retardant ABS. The filter housing is made from stainless steel.

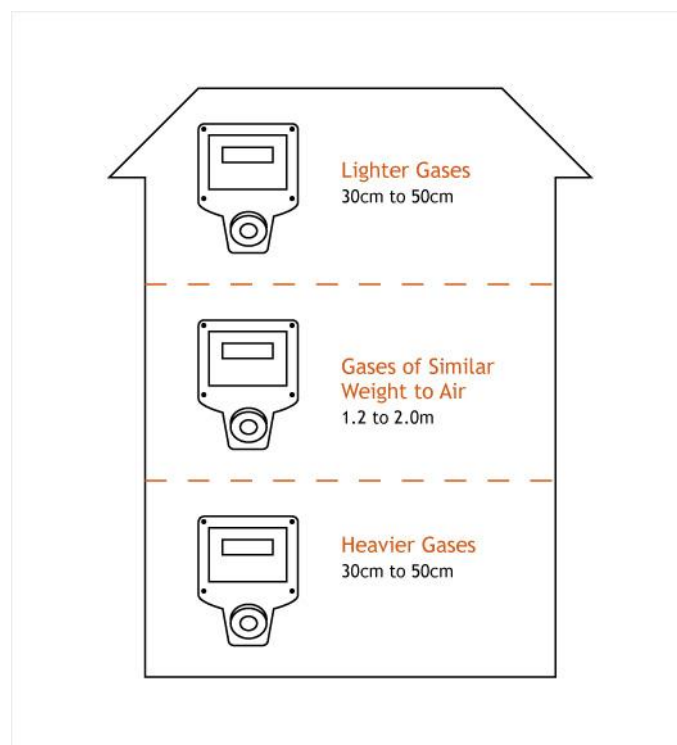
3. INSTALLATION

3.1. CONDUCTING SITE SURVEY

A thorough site survey is strongly recommended prior to installation of Zeta Gas Sense. The aim of the survey is to give the Commissioning/Installation Engineer understanding of type of gas(es) that may be present at various locations within the site. With knowledge of molecular weight of the gases he would be able to identify suitable location to place each detector. Site survey studies will also advise on number of detectors needed for optimum coverage of site.

3.2. PROPANE GAS SENSE SITTING AND SPACING

There are no absolute guidelines in determining number of detectors and their locations. Generally, we recommend enough separation between the detector, floor and ceiling bearing in mind the expected movement of the target gas.



For optimum coverage:

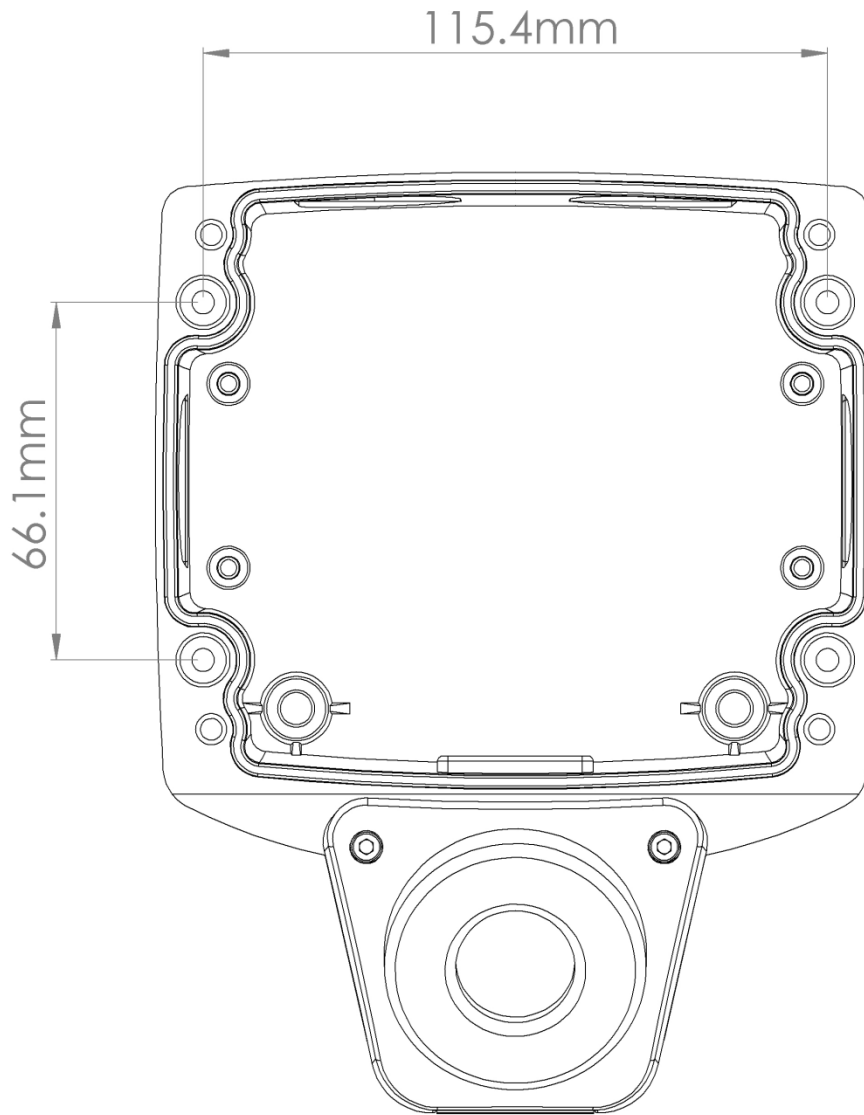
- A minimum spacing distance of 5M (16ft) between detectors.
- Position the sensor near any potential "leak source" or in the path of the gas; no more than 1.5m away.
- Target gas is heavier than air, install propane detector as near as 50cm to the ground
- Study the site. Consider mounting on a pole or on the wall as this is strictly site specific.

Zeta Gas Sense

Other installation information for gas detectors (where applicable) could be obtained from BS EN 50073:1999 code of practice.

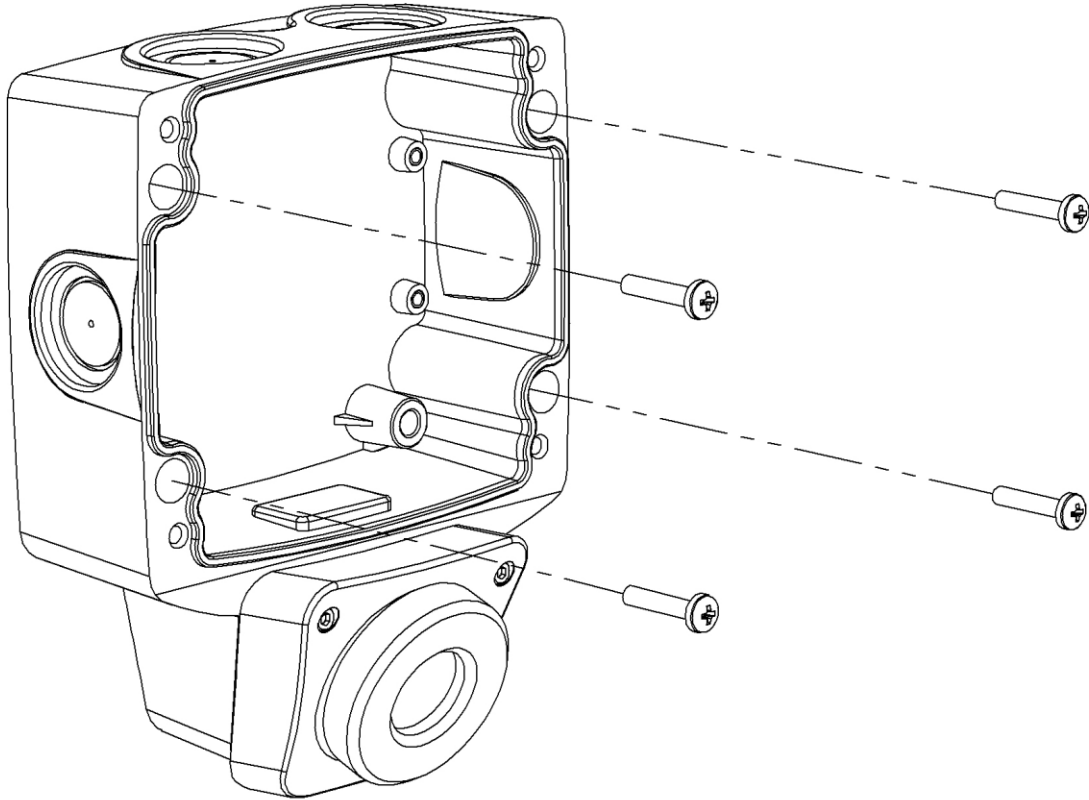
3.3. FIXING THE DETECTOR TO THE WALL

When you have decided the appropriate location for the Gas Sense, using Allen keys remove the front cover.



Place the detector on the wall and drive the four bolts provided through the detector into the wall.

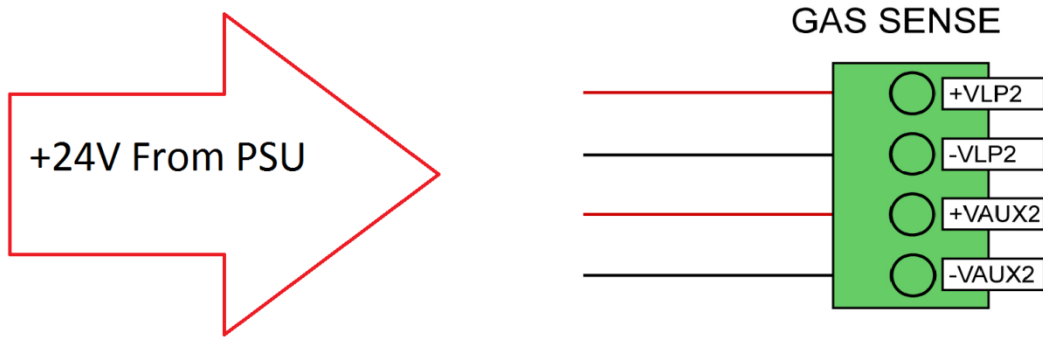
Zeta Gas Sense



3.4. WIRING THE GAS SENSE

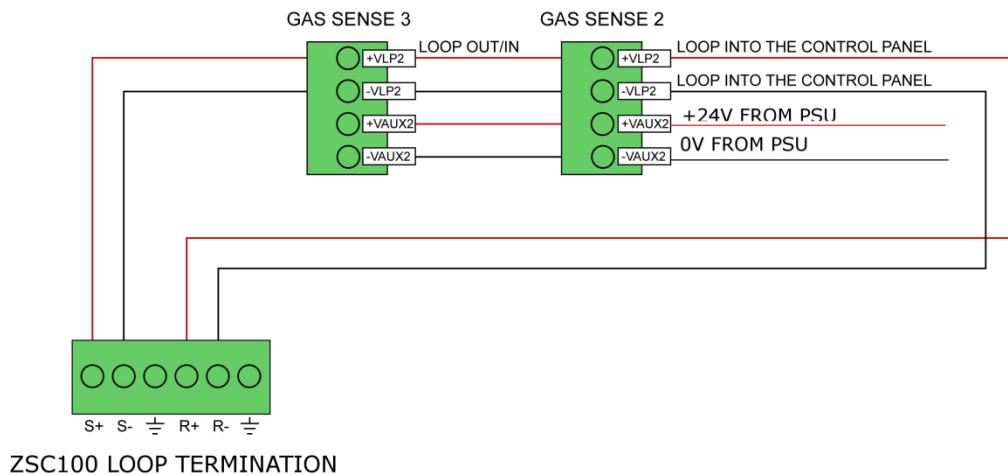
3.4.1. IN STAND-ALONE MODE, STD

Gas Sense is powered from +24V Mains via 2 pairs of cable. One pair of cable goes to **VAUX2** (**+VAUX2** and **-VAUX2**) and the other pair goes to the **VLP2** (**+VLP2** and **-VLP2**) connector block.



3.4.2. IN SYSTEM MODE, SYS

The **VLP2** terminal is 30V line voltage that runs from control panel to detectors during loop implementation. It is used for data transmission between the panel and loop detectors. If you are running a stand-alone system, you may consider a short pair of link wire to supply 24V from the **VAUX2** to **VLP2** within the detector. This can save cable cost and provide neat wiring.



A single loop gas detection system, wired in series.

3.5. CONNECTING SOUNDER TO STAND-ALONE GAS SENSE

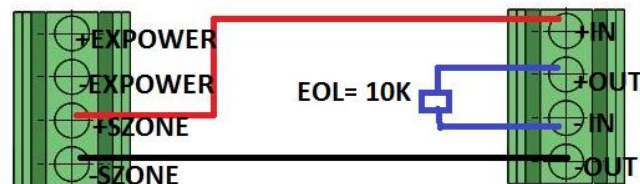
The detector has a +24V sounder output terminal. On the main PCB, identify the connection terminals, **+SZONE** and **-SZONE**.

Zeta Gas Sense

- Connect **+SZONE** from the main PCB to the **+IN** terminal of the sounder.
- Connect the **-SZONE** to the **-OUT** terminal of the sounder.
- Connect an End-of-Line resistor (10K) across the remaining pair of terminals, **+OUT** and **-IN** terminals of the sounder to allow for fault monitoring.

GAS SENSE PCB SOUNDER TERMINAL

ZETA CONVENTIONAL SOUNDER



The sounder is energized as soon as the detector goes into an alarm condition. To serve its purpose as a warning system, the sounder de-energizes and/or automatically resets immediately the GasSense returns to Normal operation or gas concentration level reduces to zero.

When a detector associated to the sounder is connected to ZSC100 gas controller panel, it is possible to temporarily reset the sounder by resetting the detector from the panel's reset button. It is also possible to control any number of sounders connected to a particular zone from the gas controller panel.

For further information read the ZSC100 Gas Sense control panel manuals.

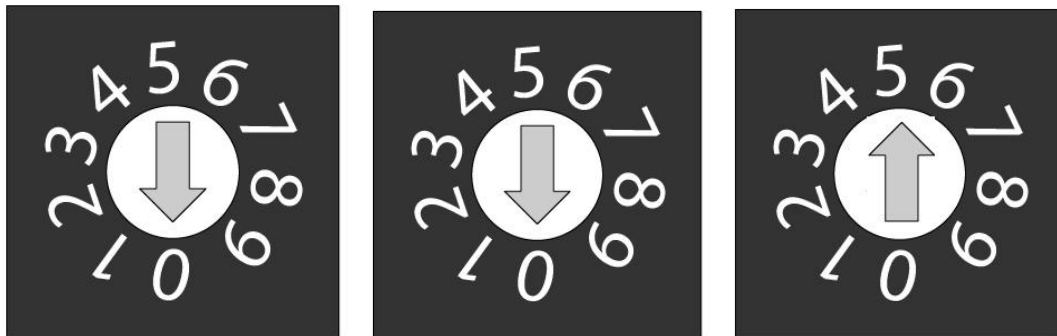
Once you are done with wiring, place the front cover and drive the four bolts across the cover into the detector using Allen keys.

4. OPERATING THE GAS SENSE

4.1. GAS SENSE ADDRESSING

Addressing detectors is important especially when they are driven on a loop. It is necessary to ensure that no two detectors have the same address. Work through the following steps to get the detector addressed.

- Identify the 3 set of address switches on the detector's main PCB.



- Set each of them to desired device address

For example to give a detector address number 5 as above

Set switch 1 to 0
Set switch 2 to 0 and
Set switch 3 to 5

4.2. USER CONTROLS

There are '←'/'↑' / '↓'/'OK' buttons

4.3. VIEWING THE ALARM LEVELS

There are 3 adjustable alarm levels provided to warn of increasing gas levels, namely **PRE-ALARM**, **ALARM1** and **ALARM2**.

4.3.1. VIEWING THE ALARM LEVEL AS A STAND-ALONE DEVICE

Press **OK** button to view the 3 alarm levels.

PRE-ALM	ALM1	ALM2
---------	------	------

Zeta Gas Sense

XXX	XXX	XXX
-----	-----	-----

- Press **OK** button to return back to **Normal Display**.

4.3.2. VIEWING THE ALARM LEVEL AS A LOOP DEVICE

- Press the **↑** and **↓** buttons simultaneously to view the alarm levels.

PRE-ALM	ALM1	ALM2
XXX	XXX	XXX

- Press **ESCAPE** (**←**) button to return back to **Normal Display**.

4.4. SETTING-UP OR ADJUSTING THE PRE-ALARM LEVEL

This is the first phase of the 3 alarm thresholds. It gives an early warning about the concentration of the target gas. The detector alarm indication moves up from **PRE-ALARM** into **ALARM1** and **ALARM2** as the atmosphere gets more flammable or toxic. Zeta Gas Sense has selectable values for the pre-alarm, Alarm1 and Alarm2 thresholds.

- Press the **↑↓** buttons simultaneously to enter into the **ACCESS** menu screen.

Access Mode

- Press **OK** to display the **PRE-ALARM** level

Adjust	PREALM
	10%LEL

- Press the **OK** button again to prompt the right pointing edit arrow, **→**

Adjust	PREALM
→	10%LEL

- Once the arrow prompts, use either the **↑** or **↓** buttons to increase or decrease the detector's **PRE-ALARM** level.

4.5. SETTING-UP OR ADJUSTING ALARM 1 LEVEL

- Press the $\uparrow\downarrow$ buttons simultaneously to enter into the **ACCESS** mode screen.

Access Mode

- Press the **OK** button and press the \uparrow button to move up till **ALARM1** screen prompts.

Adjust	ALARM1
	30%LEL

- Press the **OK** button again to prompt the right pointing edit arrow, \rightarrow

Adjust	ALARM
\rightarrow	30%LEL

- Once the arrow prompts, use either the \uparrow or \downarrow buttons to increase or decrease the detector's **ALARM1** level.

4.6. SETTING-UP OR ADJUSTING ALARM 2 LEVEL

- Press the $\uparrow\downarrow$ buttons simultaneously to enter into the **ACCESS** menu screen.

Access Mode

- Press the **OK** button and press the \uparrow button to move up till **ALARM2** screen prompts.

Adjust	ALARM1
	45%LEL

- Press the **OK** button again to prompt the right pointing edit arrow, \rightarrow

Zeta Gas Sense

Adjust →	ALARM1 45%LEL
-------------	----------------------

- Once the arrow prompts, use either the ↑ or ↓ buttons to increase or decrease the detector's **Alarm2** level.

5. FAULT-FINDING AND MAINTENANCE PRACTICES

5.1. VERIFYING INSTRUMENT PERFORMANCE-BUMP TESTING

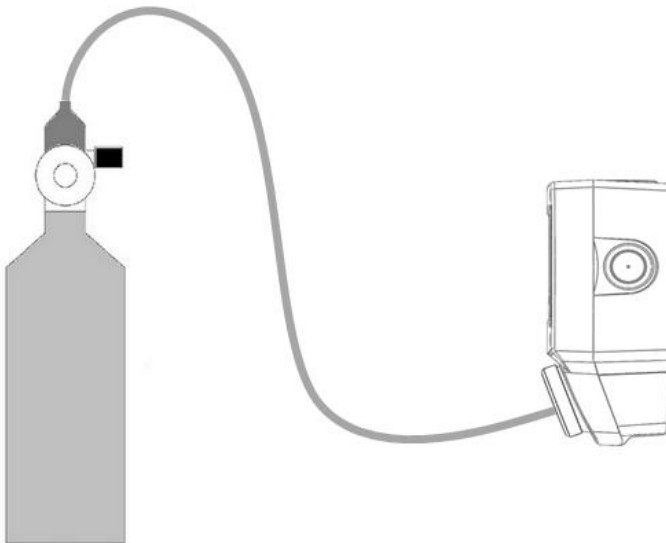
We recommend regular bump testing to verify instrument performance. Apply appropriate concentration of target gas to the instrument at least every 90 days.

TEST REQUIREMENT

Propane Gas Sense is shipped with white nozzle for controlled injection of gas. Customer is advised to obtain hose, appropriate concentration of target gas zeroed in air and fixed flow regulator.

TEST PROCEDURE

- Insert the white nozzle onto the calibration cap of the detector
- Connect one end of the hose to the white nozzle
- Insert the other end of the hose to the fixed flow regulator of the gas cylinder.
- Turn the flow regulator to release gas onto the sensor until detector reads the F.S (100%LEL)



5.2. DETECTOR SERVICING AND SENSOR REPLACEMENT

As part of scheduled maintenance, arrange with GLT Exports (or your local re-seller) for replacement sensor when it reaches its working life. The removal for maintenance or a failure of any sensor should

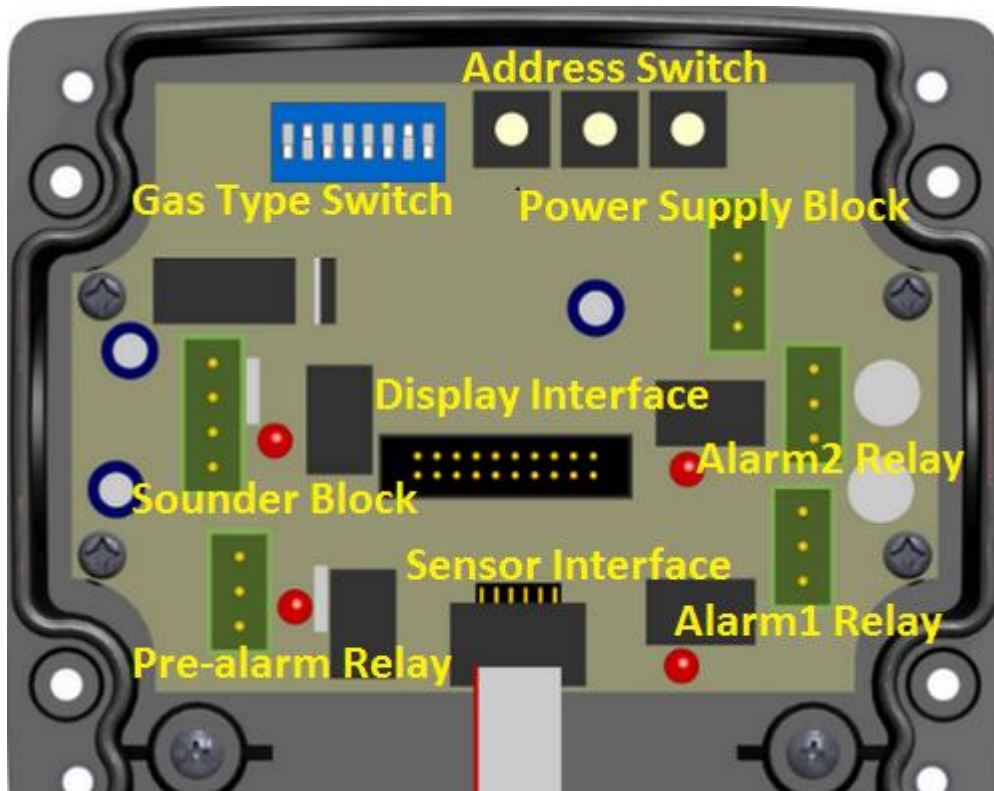
not compromise the safety of the area being protected. In compliance to EN 50073 code of practice we recommend a duplication of the detection instrument where continuous monitoring is required. Repairs and servicing on the instrument should be carried out in a safe place outside the area being protected.

5.3. GENERAL FAULT-FINDING

5.3.1. STD AND SYS FAULT

The instrument goes into “**FAULT**” when no sensor is attached, when the sensor fails, or when it is not recognized by the central control panel. Check the loop wiring and cable terminations to ensure there is no loose connection(s). Re-starting the system often corrects the fault. Also confirm that the sensor has not reached its working life. Contact GLT Exports to arrange replacement.

6. PCB TERMINATIONS AND TECHNICAL SPECIFICATIONS



6.1. TECHNICAL DATA

Operating Voltage	+24V DC	
Power Up Time	<30 Seconds	
Response time	<10 Seconds	
IP Rating		65
Maximum Humidity	0-99% RH	
Operating Temperature	-40 to +60 C	
Detection Gas	Toxic, Flammable and Oxygen gases	
Programmable Alarm Levels		3
Operating Modes	Stand-alone and Central Controlled System	
System Connection	2-wire	
Dimension	20 x 13 x 7 cm (Breadth x Width x Height)	

Quiescent Current (Combustible)

66.9mA

6.2. NORMAL DEVICE OPERATIONS

To aid system commissioning and maintenance it is useful to note that:

- It takes <10 seconds for the screen to appear upon start-up.
- A detector on the loop that is communicating with the gas control panel displays “**SYS NORMAL**” screen.

Similarly, normal operation in Standalone Mode appears on the screen as “**STD NORMAL**”

6.3. MOLECULAR WEIGHT OF TARGET GASES

CO	28
CO2	44
NO2	30
H2S	34
NH3	17
N-BUTANE	58
N-HEPTANE	100
N-HEXANE	86
N-OCTANE	114
N-PENTANE	72
PROPANE	44
TOLUENE	92
UNLEADED PETROL	114
ACETONE	58
BENZINE	78
ISOPROPYL ALCOHOL	60
ETHANOL	46
ETHYL ACETATE	88

Zeta Gas Sense

ETHYLENE	28
METHANE	16
METHANOL	32
METHYL ETHYL KETONE	72
OXYGEN	32
AIR	29

The molecular mass above is calculated from the chemical formula of the gas (using C=12, H=1 and O=16). For example, Isopropyl Alcohol with chemical formula, C_3H_8O would give a molecular mass of $(12 \times 3) + (1 \times 8) + 16 = 60$.